

AMENDMENTS TO THE CLAIMS

The following listing of claims will replace all prior versions, and listings, of claims in the application:

G1 Claims 1-22 (Canceled)

Claim 23 (Currently Amended): A method for anchoring a joining element in a part consisting of porous material, the joining element having a distal end and a proximal end and including a thermoplastic material at least at said distal end the ~~location of a preselected anchoring point~~, the method comprising the steps of:

forming a bore in the part, the bore having an inner closed end and being matched to the shape and dimensions of the joining element so that the joining element can be positioned ~~inserted into a first position~~ in the bore with substantially no force and with the distal end of the inserted joining element disposed against the inner closed end of the bore,

inserting ~~positioning~~ the joining element in the bore ~~in the first position~~ such that the distal end of the joining element is disposed against the inner closed end of the bore,

applying pressure to the proximal end of the joining element to force the ~~joining element into a second, deeper position in~~ into the bore, the pressure being applied substantially along a central axis of the bore and producing an increase of pressure of the distal end of the joining element against the inner closed end of the bore ~~at the preselected anchoring point between the joining element and walls of the bore,~~

during the application of pressure, applying vibration energy to the joining element to cause the thermoplastic to plasticize at the distal end of the joining

~~element preselected anchoring point~~, the pressure causing the plasticized thermoplastic material to flow into pores of the part beyond adjacent the inner closed end of the bore in the axial direction of the bore, thereby forming a macroscopic anchoring connection between the part and the distal end of the joining element.

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Claim 24 (Canceled)

Claim 25 (Canceled)

Claim 26 (Currently Amended): A method according to claim 23 including joining a second part made of a porous material to the first mentioned part with the joining element, wherein the joining element is a joining pin having a reduction in diameter intermediate the ends thereof forming a first shoulder, wherein the step of forming a bore includes forming a portion of the bore through the second part and into the first part to an the inner closed end, the bore in the second part having a reduction in diameter forming a second shoulder matching the first shoulder ~~reduction in diameter~~ of the joining pin, and the step of positioning includes inserting the joining pin into the first and second parts ~~with~~ so that the first and second shoulders of the joining pin and bore are in contact with each other, the contacting first and second shoulders forming a second macroscopic connection between the second part and the joining element.

Claim 27 (Currently Amended): A method according to claim 23 including joining a second part made of a porous material to the first mentioned part with the joining element, wherein the joining element is a joining pin, wherein the step of

forming a bore includes forming a portion of the bore through the second part and into the first part to an inner closed end, and wherein the joining pin has an enlarged head portion on an ~~outer~~ the proximal end thereof.

Claim 28 (Currently Amended): A method according to claim 23 including fixedly attaching the joining element to ~~the~~ a second part.

6 Claim 29 (Currently Amended): A method according to claim 28 wherein the step of fixedly attaching is performed ~~before~~ after positioning the joining element in the bore.

Claim 30 (Currently Amended): A method according to claim 23 wherein the step of applying vibration energy includes ultrasonically exciting the joining element to cause the thermoplastic to plasticize.

Claim 31 (Currently Amended): A method according to claim 23 wherein the joining element consists entirely of thermoplastic material capable of being plasticized ~~in the region of an anchoring point at a lower temperature than the remainder of the element, and wherein the step of applying energy includes heating the joining element.~~

Claim 32 (Canceled).

Claim 33 (Previously Presented) A method according to claim 23 wherein the part comprises wood or a woodlike material.

Claim 34 (Previously Presented) A method according to claim 23 wherein the part comprises at least one of sandstone, porous ceramic, burnt brick or concrete.

Claim 35 (Canceled).

36. (Currently Amended): A combination of a joining element and ~~a part~~ first and second parts comprised of a porous material and joined together by said joining element, said ~~part~~ first and second parts defining a bore, said bore having a closed inner end in the first part, an open outer end in the second part, and a cylindrical inner surface, said inner surface having a first cylindrical portion adjacent to said closed inner end, and a second cylindrical portion disposed between said first cylindrical portion and said open outer end, said second cylindrical portion having a diameter larger than said first cylindrical portion, and

6 said joining element comprising a body member disposed in said bore, said body member having a first and second portion, said first body portion having a diameter about equal to said first cylindrical portion, and a second body portion having a diameter about equal to said second cylindrical portion, said first body portion having ~~an~~ a distal end defining a first anchor point in the first part and comprising a first thermoplastic material adjacent to said first anchor point, and said second body portion defining a second anchor point in the second part adjacent to said first body portion, and comprising a second thermoplastic material adjacent to said second anchor point,


said body member having responded to an application of pressure and of vibration energy so as to have formed respective macroscopic ~~cavities~~ anchor areas in said ~~part~~ first and second parts at said first and second anchor points,

said thermoplastic materials at said first and second anchor points having been plasticized by said application of vibration energy and pressure ~~so as to have flowed into said respective macroscopic anchor cavities in said part and having been pressed into the porous material of the first and second parts to form in the anchor areas a composite of thermoplastic and porous materials.~~

Claim 37 (Currently Amended): A combination of a joining element and a first part and a second part, said ~~part~~ first and second parts being comprised of wood and defining a substantially cylindrical bore having a closed inner end in the first part and an open outer end in the second part, and

said joining element comprising an elongated body member disposed in said bore, said body member having a thermoplastic material ~~at a first anchor point~~ at a tip adjacent to said closed inner end, and

a head portion on said body member, said head portion being disposed at said open outer end of the bore,

 said thermoplastic material at said ~~first anchor point~~ tip having been responsive to an application of pressure and vibration energy to said head portion ~~and energy to said anchor point~~ so as to have formed a macroscopic anchor ~~cavity~~ area in said first part at beyond said closed inner end in the axial direction of the bore, and said thermoplastic material having been plasticized by said application of pressure and vibration energy so as to have ~~flowed~~ been pressed into said macroscopic ~~cavity~~ anchor area, and thereby to have formed a composite material of the thermoplastic material and the wood in the macroscopic anchor area ~~connection~~ to secure said joining element to said part.

Claim 38 (Canceled).

Claim 39 (Currently Amended): The combination according to claim ~~38~~ 58 wherein said joining element includes at its proximal end an internally threaded opening for receiving an attachment.

40. (Currently Amended): The combination according to claim 38 37 wherein said joining element consists entirely of thermoplastic material.

Claims 41-43 (Canceled).

Claim 44 (Currently Amended): The combination according to claim 38 37 wherein said tip of said joining element is shaped with a point.

6 Claim 45 (Currently Amended): The combination according to claim 38 37 wherein said tip of said joining element is flat or concave.

Claim 46 (Previously Presented): The combination according to claim 37 wherein said thermoplastic material is selected from the group consisting of polyamide, polycarbonate, polyester carbonate, acrylonitrile-butadiene-styrene, styrene-acrylonitrile, polymethylmethacrylate, polyvinyl chloride, polyethylene, polypropylene and polystyrene.

Claim 47 (Canceled).

48. (Currently Amended) In combination, A a joining element for attachment in and at least one part composed of porous material, said at least one part having an outer surface and defining a bore having a closed inner end in a part comprising a porous material, said joining element comprising: and an open outer end, said joining element including a body having a proximate end and a distal tip defining a first

preselected anchoring point, said body comprising first and second substantially cylindrical portions joined together at a joint region, said first cylindrical portion having a smaller diameter than the second cylindrical portion and being disposed adjacent to the distal tip, said joint region defining a second preselected anchoring point spaced from said first anchoring point,

said body comprising a first thermoplastic material at said first anchoring point and a second thermoplastic material at said second anchoring point,

~~said body having a cross-sectional area at said second anchoring point that is larger than a cross-sectional area at said first anchoring point,~~

said joining element being disposed in the bore of the at least one part,

61 said thermoplastic materials at said first and second anchoring points having being plasticizable been plasticized by an application of energy and pressure so as to extend into the porous material of the part, thereby securing the joining element to the at least one part.

49. (Currently Amended) A joining element for attachment in a bore having a closed inner end in a part comprising a porous material, said joining element comprising:

a body having a tip defining a first preselected anchoring point and further having a thermoplastic material at said first anchoring point, and at least part of the remainder of the body being from a different plastic material than said thermoplastic material, and the body ~~having an enlarged portion forming a head~~ comprising, at an end of the body opposite of the tip, means for attaching a further part,

said thermoplastic material at said first anchoring point being plasticizable by an application of vibration energy and pressure.

Claim 50 (Canceled).

Claim 51 (Currently Amended) A joining element according to claim 50 ~~and including 49, wherein the means for attaching is an internally threaded opening in~~ said body for receiving a fitting.

Claims 52 -54 (Canceled).

Claim 55 (Previously Presented): A joining element according to claim 49 wherein said tip of said element is shaped as a point.

6 Claim 56 (Previously Presented): A joining element according to claim 49 wherein said tip of said element is flat or concave.

Claim 57 (Previously Presented): A joining element according to claim 49 wherein said thermoplastic material is selected from the group consisting of polyamide, polycarbonate, polyester carbonate, acrylonitrilebutadienestyrene, styreneacrylonitrile, polymethylmethacrylate, polyvinyl chloride, polyethylene, polypropylene and polystyrene.

Claim 58 (New): A combination of a joining element and a part comprised of a porous material, the joining element being joined to the part,

said part defining a bore, said bore having a closed inner end, an open outer end and a cylindrical inner surface,

said joining element comprising a distal end and a proximal end and being disposed in the bore with the distal end adjacent the inner closed end of the bore and the proximal end adjacent the outer open end of the bore, the distal end of the joining element defining an anchor point and comprising a thermoplastic material adjacent said anchor point,

said joining element having responded to an application of pressure and vibration energy so as to have formed an anchor area in said part, said thermoplastic material at said anchor point having been plasticized by said application of vibration energy and pressure and having been pressed beyond the closed inner end of the bore in the axial direction of the bore to form in the anchor area a composite of said thermoplastic and said porous material.

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Claim 59 (New): The combination according to claim 58 wherein said joining element consists entirely of thermoplastic material.

Claim 60 (New): The combination according to claim 58 wherein said thermoplastic material is selected from the group consisting of polyamide, polycarbonate, polyester carbonate, acrylonitrilebutadienestyrene, styreneacrylonitrile, polymethylmethacrylate, polyvinyl chloride, polyethylene, polypropylene and polystyrene.

Claim 61 (New): The combination according to claim 36 wherein said joining element consists entirely of thermoplastic material.

Claim 62 (New): The combination according to claim 36 wherein said thermoplastic material is selected from the group consisting of polyamide, polycarbonate, polyester carbonate, acrylonitrilebutadienestyrene, styreneacrylonitrile, polymethylmethacrylate, polyvinyl chloride, polyethylene, polypropylene and polystyrene.

61 Claim 63 (New): The combination according to claim 48 wherein said thermoplastic material is selected from the group consisting of polyamide, polycarbonate, polyester carbonate, acrylonitrilebutadienestyrene, styreneacrylonitrile, polymethylmethacrylate, polyvinyl chloride, polyethylene, polypropylene and polystyrene.

Claim 64 (New): The combination according to claim 48, wherein the proximate end of the joining element is disposed flush with the outside surface of the at least one part.
